

REMARKS

The Office Action mailed November 3, 2004, has been received and reviewed. Claims 1 through 22 are currently pending in the application. Claims 23 through 46 are cancelled without prejudice for the filing of one or more divisional applications. Claims 1 through 5, 9 through 11, and 13 through 19 stand rejected. Claims 6 through 8, 12, and 20 through 22 have been objected to as being dependent upon rejected base claims, but the indication of allowable subject matter in such claims is noted with appreciation. Applicants have amended claims 1, 6, 9, 12, 15, and 20, and respectfully request reconsideration of the application as amended herein.

Claim Objections

Claims 1, 2, and 4 through 7 are objected to due to informalities in the claim language. The Office Action recites several instances requesting Applicant to change the recitation of “a” to “the” which is proper for antecedent basis formalities in examined claims. However, Applicants respectfully point out that the identified objections do not point to specific antecedent basis errors but rather point to the use of the word “a” used in place of the number “one” which reads better when the adjacent word is a numerical identifier. For example, Applicants invention includes at least first and second functional die each having at least a bond pad. Since Applicants’ invention as claimed may include more than two functional die, Applicants, for example, have claimed “a first functional die” and “at least a second functional die”. In the subsequent recitations of the “at least a second functional die”, Applicants recite the limitation as “the at least a second functional die”. If amendments to the claims were made as requested, the subsequent recitations would read “the at least the second functional die” which is not consistent with the maintaining the name of the element, namely “at least a second functional die” throughout the claims. Applicants’ claim to bond pads associated with the functional die also maintains the same claiming terminology, namely “a first bond pad” and “at least a second bond pad”.

Therefore, Applicants respectfully request reconsideration of the objection and a favorable withdrawal thereof.

35 U.S.C. § 102(e) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 6,486,005 to Kim

Claims 1 through 4, 9, 11 and 13 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Kim (U.S. Patent No. 6,486,005). Applicants respectfully traverse this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Applicants submit that the Kim references does not and cannot anticipate under 35 U.S.C. § 102 the presently claimed invention of presently amended independent claims 1 and 9, and claims 2, 4, and 11 depending therefrom, because the Kim reference does not describe, either expressly or inherently, the identical inventions in as complete detail as are contained in the claims.

Amended Independent Claim 1

The Office Action alleges:

Kim (fig. 3G, column 3, lines 47 et seq.) discloses a semiconductor device comprising:

A first functional die 31a including at least a first bond pad 32;

At least a second functional die 31b including at least a second bond pad 32 and formed on a common semiconductor substrate with the first functional die; and an adjacent die interconnection circuit 38 operably coupling the at least the first bond pad of the first functional die with the at least the second bond pad of the at least the second functional die. (Office Action, p. 3).

Applicants respectfully disagree that the Kim reference anticipates Applicants' invention as claimed in amended independent claim 1 which reads:

1. A semiconductor device, comprising:
a first functional die including at least a first bond pad;
at least a second functional die including at least a second bond pad, *the at least a*

second functional die formed and coupled as a unitary integral wafer segment with the first functional die; and

an adjacent die interconnection circuit operably coupling the at least a first bond pad of the first functional die with the at least a second bond pad of the at least a second functional die. (Emphasis added.)

In contrast, the Kim reference discloses:

A fan-out type chip size package is efficiently fabricated at a level of wafer sized and stress buffer layers are formed at sides of the chip to rearrange bonding pads. (col. 3, lines 13-16)

a first stress buffer layer 36 is formed at both sides of a unit semiconductor chip 31a, (col. 3, lines 19-20)

the bonding pads 32 are formed on the upper part of the wafer 31 . . . [with] a first adhesive tape 33 . . . attached on the back of the wafer 31, . . . the scribe lane on the wafer 31 is then cut . . . to form unit semiconductor chips 31a and 31b. (col. 3, lines 48-56).

Then, . . . the first adhesive tape 33 is expanded . . . [to] make the gap of the first cutting section 35 broaden . . . [then] a first stress buffer layer 36 is deposited on the whole surface including the first cutting section 35 . . . so that the semiconductor chips 31a and 31b are laterally supported. A material such as a silicon based benzocyclobutene (BCB), an oxide film or a nitride film is used as the first stress buffer layer 36, which acts as a buffer between chips and provides support. (col. 3, lines 57-67).

Clearly, the Kim reference discloses semiconductor chips individually formed on a wafer which are then individually separated from each other while attached to tape which can be stretched to expand the overall footprint of the wafer by increasing the spacing between each of the individually sectioned semiconductor chips. The spaces between the chips are then filled with material that in essence “glues the further-spaced apart chips back together for a lead forming process where the leads are formed on the newly deposited “stress buffer layer” deposited between the individual chips. The chips are then individually cut from each other by scribing them in the “glued” regions.

Nothing in Kim discloses integrated circuits that “coupled as a unitary integral wafer segment” as claimed by Applicants. Specifically, Kim does not disclose “A semiconductor device, comprising: a first functional die including at least a first bond pad; at least a second functional die including at least a second bond pad, *the at least a second functional die formed*

and coupled as a unitary integral wafer segment with the first functional die; and an adjacent die interconnection circuit operably coupling the at least a first bond pad of the first functional die with the at least a second bond pad of the at least a second functional die” as claimed in Applicants’ amended independent claim 1.

Therefore, independent claim 1, and claims 2-4 depending therefrom, are not anticipate by the Kim reference under 35 U.S.C. § 102. Accordingly, such claims are allowable over the cited prior art and Applicants respectfully request that such rejections be withdrawn.

Amended Independent Claim 9

The Office Action alleges:

Regarding claim 9, Kim (fig. 3G, column 3, lines 47 et seq.) discloses a segment of a semiconductor wafer, comprising: two functional dice 31a and 31b each including at least one bond pad 32, the two functional dice being on a unitary semiconductor wafer segment; and an adjacent die interconnection circuit 38 for mutually operably coupling each at least one bond pad of the two functional dice to at least one other bond pad 32 of the two functional dice. (Office Action, p. 4).

Applicants respectfully disagree that the Kim reference anticipates Applicants’ invention as claimed in amended independent claim 9 which reads:

9. A segment of a semiconductor wafer, comprising:
two or more functional dice each including at least one bond pad, *the two or more functional dice being on a unitary integral wafer segment*; and
an adjacent die interconnection circuit for mutually operably coupling each at least one bond pad of the two or more functional dice to at least one other bond pad of the two or more functional dice. (Emphasis added.)

Applicants herein sustain the characterization of the description of Kim and arguments proffered above with reference to the lack of description regarding Applicants’ invention as claimed. Specifically, Kim does not disclose “the two or more functional dice being on a unitary integral wafer segment” as claimed by Applicants in amended independent claim 9.

Therefore, independent claim 9, and claims 11 and 13 depending therefrom, are not anticipate by the Kim reference under 35 U.S.C. § 102. Accordingly, such claims are allowable over the cited prior art and Applicants respectfully request that such rejections be withdrawn.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 6,486,005 to Kim in view of U.S. Patent No. 6,744,067 to Farnworth et al.

Claims 5, 10, and 14 through 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim (U.S. Patent No. 6,486,005) in view of Farnworth et al. (U.S. Patent No. 6,744,067). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

The 35 U.S.C. § 103(a) obviousness rejections of claims 5, 10, and 14 through 19 are improper because the elements for a *prima facie* case of obviousness are not met. Specifically, the rejection fails to meet the criterion that the prior art reference must teach or suggest all the claims limitations.

Claim 5

Regarding claim 5, which depends from amended independent claim 1, Applicants sustain the above-proffered arguments that Kim does not teach, disclose or motivate Applicants' invention as claimed in amended independent claim 1. The Office Action introduces the Farnworth reference and alleges:

Farnworth et al. disclose that a first functional die and a second functional die are separated by at least one nonfunctional die (column 3, lines 28-30). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to test the device structure of Kim by having the nonfunctional die between the first and second functional dice, as taught by Farnworth et al., for testing of each individual die or groups of dice in order to determine and segregate operation dice from non functional die (column 8, lines 25-28). (Office Action , p. 5)

A closer reading of Farnworth states that discloses “semiconductor die is fabricated according to conventional fabrication processes with each die including a defined number of die contacts that are electrically exposed for subsequent interconnection with other electronic components. One embodiment of the [Farnworth] invention contemplates busing contacts of interest together from at least one die to at least one other die for wafer-level testing.” (Col. 2, lines 30-37).

Applicants respectfully submit that neither the Kim reference or the Farnworth reference, either individually or in any proper combination, teach, disclose or motivate Applicants’ invention as claimed in independent claim 1 from which claim 5 depends, namely:

1. A semiconductor device, comprising:
a first functional die including at least a first bond pad;
at least a second functional die including at least a second bond pad, *the at least a second functional die formed and coupled as a unitary integral wafer segment with the first functional die*; and
an adjacent die interconnection circuit operably coupling the at least a first bond pad of the first functional die with the at least a second bond pad of the at least a second functional die. (Emphasis added.)

Therefore, Applicants respectfully request that the rejection of dependent claim 5 be withdrawn.

Claims 10 and 14

Regarding claims 10 and 14, which depend from amended independent claim 9, Applicants sustain the above-proffered arguments regarding the Kim and Farnworth references and the respective lack of teaching, disclosure and motivation of Applicants’ invention as claimed in amended independent claim 9.

Applicants respectfully submit that neither the Kim reference or the Farnworth reference, either individually or in any proper combination, teach, disclose or motivate Applicants’ invention as claimed in independent claim 9 from which claims 10 and 14 depend, namely:

9. A segment of a semiconductor wafer, comprising:
two or more functional dice each including at least one bond pad, *the two or more functional dice being on a unitary integral wafer segment*; and
an adjacent die interconnection circuit for mutually operably coupling each at least one

bond pad of the two or more functional dice to at least one other bond pad of the two or more functional dice. (Emphasis added.)

Therefore, Applicants respectfully request that the rejection of dependent claims 10 and 14 be withdrawn.

Claims 15 through 19

Regarding amended independent claim 15 and claims 16 through 19 which depend therefrom, Applicants sustain the above-proffered arguments regarding the Kim and Farnworth references and the respective lack of teaching, disclosure and motivation of Applicants' invention as claimed in amended independent claim 15.

Applicants respectfully submit that neither the Kim reference or the Farnworth reference, either individually or in any proper combination, teach, disclose or motivate Applicants' invention as claimed in independent claim 15 from which claims 16 through 19 depend, namely:

15. A semiconductor wafer, comprising:
a plurality of dice each including a bond pad, the plurality of dice segregated according to functional dice and nonfunctional dice; and
an adjacent die interconnection circuit operably coupling a first bond pad of a first functional die with a second bond pad of a second functional die, ***the first functional die and the second functional die being on a unitary integral portion of the semiconductor wafer and further configured as an independently functional segment of the semiconductor wafer.*** (Emphasis added.)

Therefore, Applicants respectfully request that the rejection of amended independent claim 15, and claims 16 through 19 depending therefrom, be withdrawn.

Objections to Claims 6-8, 12 and 20-22/Allowable Subject Matter

Claims 6 through 8, 12, and 20 through 22 stand objected to as being dependent upon rejected base claims, but are indicated to contain allowable subject matter and would be allowable if placed in appropriate independent form.

Applicants have amended the respective independent claims from which the objected-to dependent claims depend. Applicants respectfully maintain that the objected to claims remain allowable in view of the amended independent claims

ENTRY OF AMENDMENTS

The amendments to claims 1, 6, 9, 12, 15, and 20 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not raise new issues or require a further search.

CONCLUSION

Claims 1 through 22 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



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